6.2 Overview w/ Applications

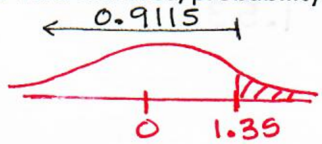
§6-2 WS#2

MATH 1610/MATH 1552
SECTION 6.2 WS #2

Name: KEY

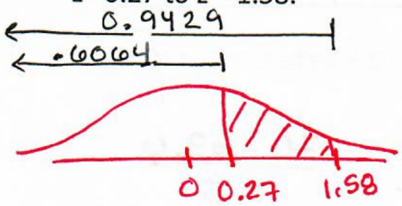
1. Find the area/probability under the normal curve to the left of z = 1.24. **0.8925**

2. Find the area/probability under the normal curve to the right of z = 1.35. **0.0885**



$1 - 0.9115 = 0.0885$

3. Find the area/probability under the normal curve over the interval from z =0.27 to z = 1.58. **0.3365**

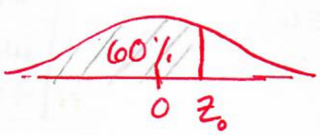


$0.9429 - 0.6064$
$= 0.3365$

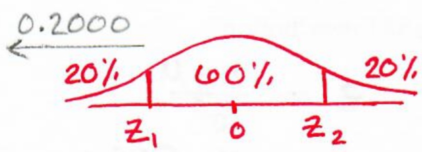
4. Determine the z-value that is associated with a probability of 0.35. **-0.39 (-0.385)**

5. Determine the z-value that is associated with a probability of 0.85. **1.04**

6. Determine the z-value that is associated with the 60th percentile of the normal distribution. **0.25 (0.255)**



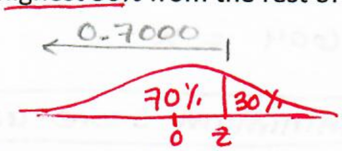
7. Determine the z-values associated with the middle 60% of the normal distribution. **±0.84**



$z_1 = -0.84$
$z_2 = +0.84$

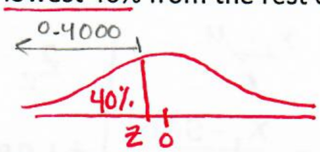
8. For a normal distribution, find the z-score that separates:

a. the highest 30% from the rest of the distribution.



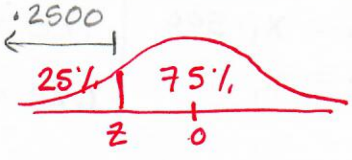
$z = 0.52$

b. the lowest 40% from the rest of the distribution.



$z = -0.25$

c. the highest 75% from the rest of the distribution.

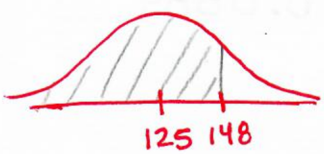


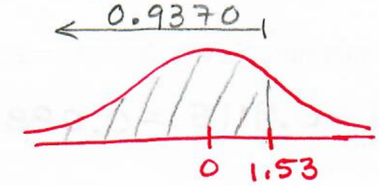
$z = -0.67$

$$z = \frac{x-\mu}{\sigma} \quad \text{or} \quad z = \frac{\bar{x}-\mu}{s}$$

9. A fifth grader took a standardized achievement test which has a mean score of 125 and a standard deviation of 15. The student's score was 148. What is the student's percentile rank?

original $\mu = 125$, $\sigma = 15$ — standardized





$$z = \frac{148-125}{15}$$

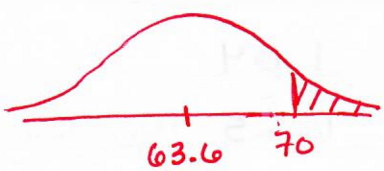
$$z = 1.53$$

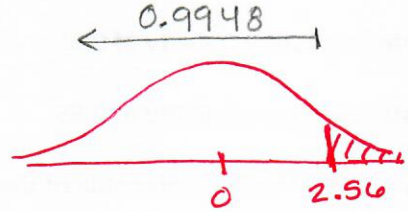
$P(x \le 148) = P(z \le 1.53)$
$= 0.9370$

$\boxed{94^{th} \text{ percentile}}$

10. Women have a mean height of 63.6 inches and a standard deviation of 2.5 inches. What is the probability that a woman is 70 inches or taller?

original $\mu = 63.6$, $\sigma = 2.5$ — standardized





$$z = \frac{70-63.6}{2.5}$$

$$z = 2.56$$

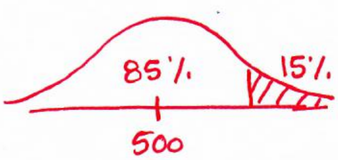
$P(x \ge 70) = P(z \ge 2.56)$
$= 1 - 0.9948$
$= 0.0052$

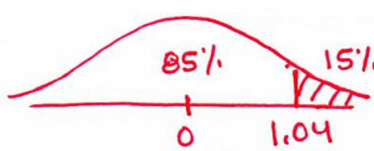
$\boxed{\text{0.52\% chance a woman is taller than 70 inches.}}$

11. Scores on the SAT form a normal distribution with a mean of 500 and standard deviation of 100.

a. What is the minimum score necessary to be in the top 15% of the SAT distribution?

original $\mu = 500$, $\sigma = 100$ — standardized





$$z = \frac{x-\mu}{\sigma}$$

$$1.04 = \frac{x-500}{100}$$

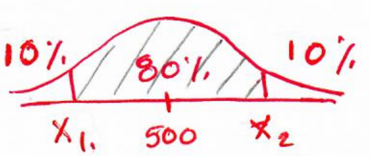
$$104 = x - 500$$

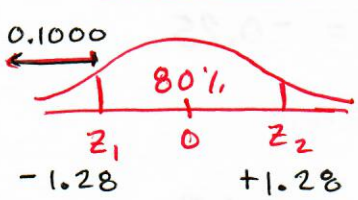
$$604 = x$$

$\boxed{\text{minimum score 604}}$

b. Determine the range of scores that defines the middle 80% of the distribution of SAT scores.

original — standardized





$z_1 = \frac{x_1-\mu}{\sigma}$ | $z_2 = \frac{x_2-\mu}{\sigma}$

$-1.28 = \frac{x_1-500}{100}$ | $+1.28 = \frac{x_2-500}{100}$

$-128 = x_1 - 500$ | $128 = x_2 - 500$

$372 = x_1$ | $628 = x_2$

The middle 80% of scores are between 372 and 628.